



Johns Manville Roofing System Submittal Package

Project Name:

Project Address:

JM Approved Roofing Contractor:

SBS Heat-Weld Modified Bitumen Specification 2FD-HW

Two Ply Heat Welded Modified Bitumen Mineral Surfaced Roofing System
For use over Johns Manville (JM) insulation, approved decks, or other approved insulations on inclines up to 6" per foot (500 mm/m).

Materials per 100 sq. ft. (9.3 m²) of Roof Area

Primer (if required):	
JM Concrete Primer	1 gallon (3.8 liters)

Base Felts:	
DynaWeld Base	1 layer

Cap:	
DynaWeld Cap FR or DynaClad*	1 layer

*DynaClad cannot be used for a membrane on any roof that will have significant foot traffic.

General

This specification is for use over any type of approved structural deck which is not nailable and which provides a suitable surface to receive the roof. Poured and pre-cast concrete decks require priming with JM Concrete Primer prior to application of the first heat welded modified bitumen ply. This Specification is not to be used over poured or pre-cast gypsum decks, light-weight insulating concrete decks or fills without JM insulation.

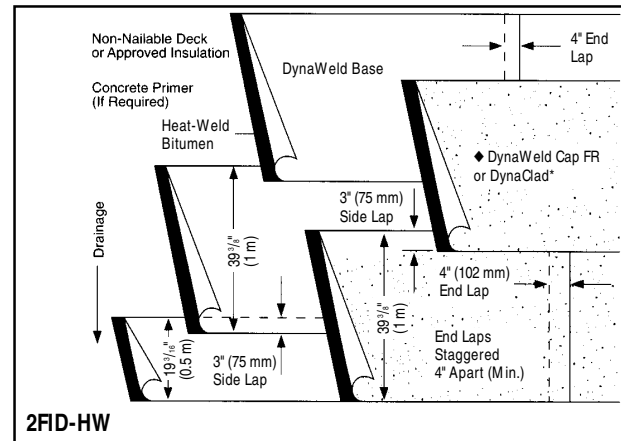
This specification is also for use over JM roof insulations, or other approved roof insulations which are not nailable and which provide a suitable surface to receive the roof. Specific written approval is required for any roof insulation that is not supplied by JM. Insulation should be installed in accordance with the appropriate JM Insulation Specification detailed in the JM Commercial/Industrial Roofing Solutions Manual. This specification can also be used in certain reroofing situations. Refer to the "Reroofing" section of the JM Commercial/Industrial Roofing Solutions Manual.

For heat weld application directly to the insulation, the top layer of insulation must be JM DuraBoard™. Design and installation of the deck and/or roof substrate must result in the roof draining freely, to outlets numerous enough and so located as to remove water promptly and completely. Areas where water ponds for more than 24 hours are unacceptable and will not be eligible for a JM Roofing Systems Guarantee.

Note: All general instructions contained in the current JM Commercial/Industrial Roofing Solutions Manual shall be considered part of this specification.

Refer to the Material Safety Data Sheet and product label prior to using the products listed in this specification.

RS-4256 8-99



Flashings

Flashing details can be found in the "Bituminous Flashings" section of the JM Commercial/Industrial Roofing Solutions Manual.

Application

On roof decks with slopes up to 1 1/2" per foot (124.8 mm/m), the roofing felts and modified bitumen sheets may be installed either perpendicular or parallel to the roof incline.

Heat weld a 19 3/16 (0.5 m) wide piece of one of the base plies listed. The remaining plies are to be applied full width, with 3" (75 mm) side and 4" (102 mm) end laps over the preceding sheets.

Heat weld a full width piece of one of the cap sheets listed over the installed base felt. Subsequent sheets are to be applied in the same manner, with 4" (102 mm) side laps and 4" (102 mm) end laps over the preceding sheet.

Apply all sheets so that they are firmly and uniformly set, without voids. Using a propane torch, apply the flame to the surface of the coiled portion of the roll. Torch across the full width of the roll and along the lap area. As the surface is heated, it will develop a sheen and the burn-off will disappear. The generation of smoke is an indication that the material is being overheated. Repeat the operation with subsequent rolls, maintaining proper side laps and end laps. A healthy compound flow will simplify seaming the laps. This is done by keeping the flame directed at the adhered ply and in front of the roll. At the end laps, soften the bitumen by heating the granule surface with the torch. When the granules start to sink into the bitumen, stop torching and with a hot trowel, embed the granules into the bitumen. All laps must be checked for good adhesion.

Preparation of the 4" (102 mm) lap of DynaClad requires the removal of 4" (102 mm) of metal surfacing, creating the selvage edge. Next, apply heat to the lap that is being seamed, making sure there is a compound flow to adhere the two surfaces. All laps must be checked for good adhesion.

For cold weather application techniques, refer to Paragraph 7C.14 of the "Modified Bitumen Specifications" section of the JM Commercial/Industrial Roofing Solutions Manual.

Surfacing

No additional surfacing is required.

Steep Slope Requirements

Special procedures are required on incline over 1/2" per foot (41.6 mm/m). Refer to Paragraph 7C.12 of the "Modified Bitumen Specifications" section of the JM Commercial/Industrial Roofing Solutions Manual.

Application of Johns Manville (JM) APP and SBS Modified Bitumen Products may require the use of an open flame propane torch. Improper use of these materials and application equipment can result in severe burns, and/or other physical injury, as well as damage to property. In order to prevent these situations, the mechanic must install the materials using the techniques recommended by JM and those found in "A Guide to Safety: Torch-On Modified Bitumens" available from the Asphalt Roofing Manufacturers Association. These techniques have been endorsed by the National Roofing Contractors Association and the United Union of Roofers, Waterproofers and Allied Workers.

The Roofing contractor must ensure that all mechanics or applicators involved with the application of heat welded modified bitumens are properly trained not only in application and equipment handling, but safety measures. The contractor should verify that all roofing applicators involved with open flame application maintain and carry a valid Certified Roofing Torch Applicator ("CERTA") card as evidence of proper training. Further, the general contractor, jobsite superintendents and the building owner or its representative must also be knowledgeable and/or advised of the proper and necessary safety precautions applicable to heat welded roofing products.

LIMITED WARRANTY/SPECIFICATIONS

All products sold are subject to the following limited warranty: Seller warrants that for a period of one year from the date of shipment the product will be free from defects in material and workmanship and is manufactured in all material respects to Seller's product specifications. Note: Seller's products may vary in details of design and construction from descriptions in any literature or from any sample, display or other model inspected by Purchaser.

SELLER DISCLAIMS ALL OTHER REPRESENTATIONS AND WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, IN FACT OR IN LAW, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. Every claim under this limited warranty shall be deemed waived unless in writing and received by Seller within 10 days of delivery if visibly damaged or defective, and, otherwise, within 30 days after the defect to which each claim relates is discovered, or should have been discovered, but in no event longer than 1 year after product shipment.

LIMITATION OF REMEDY

PURCHASER'S EXCLUSIVE REMEDY AND THE LIMIT OF SELLER'S LIABILITY FOR BREACH OF THE LIMITED WARRANTY SET FORTH IN THE ABOVE LIMITED WARRANTY/SPECIFICATIONS, WHETHER BASED ON NEGLIGENCE, BREACH OF WARRANTY, STRICT LIABILITY, OR ANY OTHER THEORY, SHALL BE, AT SELLER'S OPTION, REPAIR, REPLACEMENT WITH A LIKE QUANTITY OF NON-DEFECTIVE PRODUCT OR REFUND OF THE PURCHASE PRICE, PLUS REASONABLE COMMERCIAL CHARGES INCURRED FOR APPROVED RETURNS.

NO RECOVERY OF CONSEQUENTIAL OR SPECIAL DAMAGES

SELLER SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL OR SPECIAL DAMAGES BASED ON NEGLIGENCE, BREACH OF WARRANTY, STRICT LIABILITY, OR ANY OTHER THEORY, FOR FAILURE TO PERFORM ITS OBLIGATIONS UNDER THIS AGREEMENT. ADDITIONALLY, CONSEQUENTIAL AND SPECIAL DAMAGES SHALL NOT BE RECOVERABLE EVEN IF THE REPAIR, REPLACEMENT OR REFUND REMEDY FOR SELLER'S BREACH OF ITS LIMITED WARRANTY FAILS OF ITS ESSENTIAL PURPOSE OR FOR ANY OTHER REASON.

For additional sales and product information, contact the Johns Manville Regional Office nearest you.

NORTHEASTERN

437 Atlantic Avenue
Berlin, NJ 08009-9700
609.768.7003
FAX: 609.768.7034

**For Technical Services
Information**
800.345.9603

SOUTHEASTERN

3901 Roswell Road,
Suite 215
Marietta, GA 30062
770.578.3190

**For Technical Services
Information**
800.633.8594

MIDWESTERN

2151 W. Channahon Road
Rockdale, IL 60436-8559
815.744.1545
FAX: 815.741.6131

**For Technical Services
Information**
800.231.1064

SOUTHWESTERN

P.O. Box 9069
Fort Worth, TX 76147-2069
817.339.1500
FAX: 817.339.1540

**For Technical Services
Information**
800.654.0071

WESTERN

3rd & Harbor Streets
Pittsburg, CA 94565
925.432.6426
FAX: 925.427.2409

**For Technical
Services Information**
800.922.5922

Canadian Customer Service

Write to:
27 Pearl Street
Portland, ME 04101
877.766.3295
(877 Roof By JM)
FAX: 800.343.1331

For Guarantee Information

Guarantee Services
Department
P.O. Box 625001
Littleton, CO 80162-5001
303.978.2191
FAX: 303.978.2808

For bilingual and international assistance, please call:

Yolanda Griepentrog
303.978.4655 or
FAX: 303.978.3904

Product Information Center 800.654.3103 303.978.2318 (FAX)

**Additional Information:
FAX Express® 888.329.3977
www.jm.com**



Johns Manville

Roofing Systems Group

717 17th Street
Denver, CO 80202
800.654.3103
303.978.2318 FAX
www.jm.com

Health and Safety

Johns Manville maintains Material Safety Data Sheets (MSDS) for all of its products. These MSDS contain health and safety information for development of appropriate product handling procedures to protect your employees and customers. These MSDS are available and should be read and understood by all personnel using and handling these materials.

The physical and chemical properties of the products described herein represent typical, average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Consult a Johns Manville Regional Office to assure current information.

Gold Shield® Roofing Systems Guarantee
Built-Up and Modified Bitumen

Building Owner:

Building Name:

Approved Roofing Contractor:

Guarantee Number:

Term & Maximum Monetary Obligation to Maintain a Watertight Roofing System

Date of Completion:

Years

\$

COVERAGE

The components of the Roofing System covered by this Guarantee are:

- Membrane Spec. and Type**
- Flashing Spec. and Type**
- Insulation Type**
- Accessories (Type and Quantity)**

These Johns Manville Guaranteed components are referred to below as the "Roofing System", and ALL OTHER COMPONENTS OF THE OWNER'S BUILDING ARE EXCLUDED FROM THE TERMS OF THIS GUARANTEE.

Johns Manville* guarantees to the original Building Owner that during the Term commencing with the Date of Completion, JM will pay for the materials and labor required to promptly repair the Roofing System to return it to a watertight condition if leaks occur due to: ordinary wear and tear, or deficiencies in any or all of the component materials of the Roofing System or workmanship deficiencies in the application of the Roofing System.

WHAT TO DO IF YOUR ROOF LEAKS

If you should have a roof leak please refer to directions on the reverse side.

LIMITATIONS AND EXCLUSIONS

This Guarantee is not a maintenance agreement or an insurance policy; therefore, routine inspections and maintenance are the Building Owner's responsibility (see reverse side of this document). Failure to follow the Maintenance Program on the reverse side of this document will void the Guarantee. This Guarantee does not obligate JM to repair the Roofing System or any part of the Roofing System, for leaks resulting from (a) natural disasters including but not limited to the direct or indirect effect of lightning, fire, hailstorm, earthquake, tornadoes, hurricanes or other extraordinary natural occurrence and/or wind speeds in excess of 72 miles per hour, (b) misuse, abuse or negligence, (c) installation or material failures other than those involving the component materials expressly defined above as the Roofing System or exposure of the Roofing System components to damaging substances such as oil or solvents or to damaging conditions such as vermin, (d) changes to the Roofing System or the Building's usage that are not preapproved in writing by JM, or (e) failure of the Building substrate (mechanical, structural or otherwise and whether resulting from Building movement, design defects or other causes) or improper drainage. JM is not responsible for leaks and damage resulting from water entry from any portion of the Building structure not a part of the Roofing System.

This Guarantee becomes effective when (1) it is delivered to Owner; and (2) all bills for installation, materials and services have been paid in full to the Approved Roofing Contractor and to JM. Until that time, this Guarantee is not in force and has no effect.

The parties agree that any controversy or claims relating to this Guarantee shall be first submitted to mediation under the Construction Industry Arbitration and Mediation Rules of the American Arbitration Association (Regular Track Procedures) or to such other mediation arrangement as the parties mutually agree. No court or other tribunal shall have jurisdiction until the mediation is completed.

TO THE FULLEST EXTENT PERMITTED BY LAW, JM DISCLAIMS ANY IMPLIED WARRANTY, INCLUDING THE WARRANTY OF MERCHANTABILITY AND THE WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, AND LIMITS SUCH WARRANTY TO THE DURATION AND TO THE EXTENT OF THE EXPRESS WARRANTY CONTAINED IN THIS GUARANTEE.

THE EXCLUSIVE RESPONSIBILITY AND LIABILITY OF JM UNDER THIS GUARANTEE IS TO MAKE REPAIRS NECESSARY TO MAINTAIN THE ROOFING SYSTEM IN A WATERTIGHT CONDITION IN ACCORDANCE WITH THE OBLIGATIONS OF JM UNDER THIS GUARANTEE.

JM AND ITS AFFILIATES WILL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES TO THE BUILDING STRUCTURE (UPON WHICH THE ROOFING SYSTEM IS AFFIXED) OR ITS CONTENTS, LOSS OF TIME OR PROFITS OR ANY INCONVENIENCE. JM AND ITS AFFILIATES SHALL NOT BE LIABLE FOR ANY DAMAGES WHICH ARE BASED UPON NEGLIGENCE, BREACH OF WARRANTY, STRICT LIABILITY OR ANY OTHER THEORY OF LIABILITY OTHER THAN THE EXCLUSIVE LIABILITY SET FORTH IN THIS GUARANTEE.

No one is authorized to change, alter or modify the provisions of this Guarantee other than the Manager, Marketing and Technical Services or authorized delegate. JM's delay or failure in enforcing the terms and conditions contained in this Guarantee shall not operate as a waiver of such terms and conditions. This Guarantee is solely for the benefit of the Building Owner identified above and Building Owner's rights hereunder are not assignable. Upon sale or other transfer of the Building, Building Owner may request transfer of this Guarantee to the new owner, and JM may transfer this Guarantee, in its sole discretion only after receiving satisfactory information and payment of a transfer fee, which must be paid no later than 30 days after the date of Building ownership transfer.

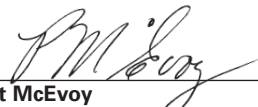
In the event JM pays for repairs which are required due to the acts or omissions of others, JM shall be subrogated to all rights of recovery of the Building Owner to the extent of the amount of the repairs.

Because JM does not practice Engineering or Architecture, neither the issuance of this Guarantee nor any review of the Building's construction or inspection of roof plans (or the Building's roof deck) by JM representatives shall constitute any warranty by JM of such plans, specifications and construction or in any way constitute an extension of the terms and conditions of this Guarantee. Any roof inspections are solely for the benefit of JM.

JM does not supervise nor is it responsible for a roofing contractor's work except to the extent stated herein, and roofing contractors are not agents of JM.

*JOHNS MANVILLE ("JM"), is a Delaware corporation with its principal mailing address at P.O. Box 5108, Denver, Colorado 80217-5108.

Accepted By Owner's Authorized Representative

By: 
 Title: Sr. Vice President,
 Roofing Systems Group

Date of Signature

Attorney-in-Fact



DynaWeld™ Cap FR

Description

DynaWeld Cap FR is a fire resistant modified bitumen sheet incorporating the features of a strong fiber glass mat with a blend of SBS (Styrene-Butadiene-Styrene) rubber, high quality asphalt and fire retardant additives.

The elastometric asphalt blend has full recovery properties after 100% elongation and lends elasticity and flexibility to the sheet. The inorganic fiberglass reinforcement provides tensile strength, stability and toughness to the product and resists moisture absorption. These properties also afford the product better resistance to the other factors which affect roof performance. The covering layer of ceramic-coated roofing granules provides durability along with superior resistance to damage from weather and foot traffic. The back of the sheet has a polyolefin burn-off film for ease of heat welding.

Use

DynaWeld Cap FR is designed for use as a quality modified bitumen sheet in UL fire rated, multiple ply roofing systems. DynaWeld Cap FR unlike many modified bitumen products, enjoys UL Class A Ratings in numerous constructions, both new and reroof, without the use of additional surfacing. It is ideal for low slope applications (inclines up to 3 inches). Because of its superior weatherability, durability, and handling characteristics, DynaWeld Cap FR may be used both for a finished cap sheet and as a flashing material. This product may only be installed using heat-welding application techniques.



Advantages

- The heavy fiber glass mat provides exceptional tensile strength and puncture resistance
- The elongation and recovery properties of the SBS blend allow the product to easily accommodate the continual expansion and contraction strains experienced on all roofs
- The product's flexibility and dimensional stability provide ease of handling, resulting in quick installations
- Fire-retardant formulation

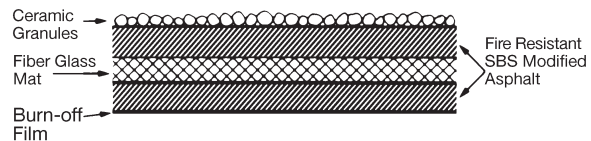
Typical Physical Properties

Material meets or exceeds the criteria for ASTM D 6163, Type I, Grade G.

Thickness	160 mils (4.0 mm)
Tensile Strength @ 0°F (-18°C)	
Machine Direction	135 lbs. force/in. width (23.6 kN/m)
Cross Machine Direction	95 lbs. force/in. width (16.6 kN/m)
Elongation @ -0°F (-18°C)	
Machine Direction	4%
Cross Machine Direction	4%
Tensile-Tear	
Machine Direction	125 lbs./in. (21.9 kN/m)
Cross Machine Direction	100 lbs./in. (17.5 kN/m)
Low Temperature Flexibility	-10°F (-23°C)
Dimensional Stability	
Machine Direction	0.20% change
Cross Machine Direction	0.20% change

Sizes

Roll size	1 square (9.29 m ²)
Roll weight	110 lbs (49.8 kg)
Roll length	32' 10" (10 m)
Roll width	39 ³ / ₈ " (1 m)



Refer to the Material Safety Data Sheet and Product Label prior to using this product. For an identical copy of this data sheet ask for RS-4387.



DynaWeld™ Base

Description

DynaWeld Base is a modified bitumen sheet incorporating the features of a fiber glass mat with a blend of SBS (Styrene-Butadiene-Styrene) rubber and high quality asphalt.

The elastometric asphalt blend has full recovery properties after 100% elongation and lends elasticity and flexibility to the sheet. The inorganic fiberglass reinforcement provides tensile strength, stability and toughness to the product and resists moisture absorption. These properties also afford the product better resistance to the other factors which affect roof performance. The back of the sheet has a polyolefin burn-off film for ease of heat welding.

Use

DynaWeld Base is designed for use as a base or ply in multiple ply modified bitumen roofing systems. It is ideal for low slope applications (inclines up to 3 inches). This product may only be installed using heat-welding application techniques.



Advantages

- The fiber glass mat provides excellent tensile strength and puncture resistance
- The elongation and recovery properties allow the product to easily accommodate the continual expansion and contraction strains experienced on all roofs
- The product's flexibility and dimensional stability provide ease of handling, resulting in quick installations

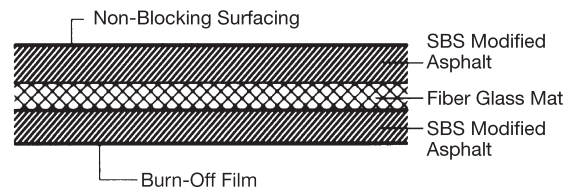
Typical Physical Properties*

Material meets or exceeds the criteria for ASTM D 6163, Type I, Grade S.

Thickness	120 mils (3 mm)
Tensile Strength @ 0°F (-18°C)	
Machine Direction	95 lbs. force/in. width (15.8 kN/m)
Cross Machine Direction.....	85 lbs. force/in. width (12.3 kN/m)
Elongation @ 0°F (-18°C)	
Machine Direction	3.0%
Cross Machine Direction	3.0%
Tensile-Tear	
Machine Direction.....	105 lbs./in. (17.5 kN/m)
Cross Machine Direction	95 lbs./in. (15.8 kN/m)
Low Temperature Flexibility	-10°F (-21°C)
Dimensional Stability	
Machine Direction	0.20% change
Cross Machine Direction.....	0.20% change

Sizes

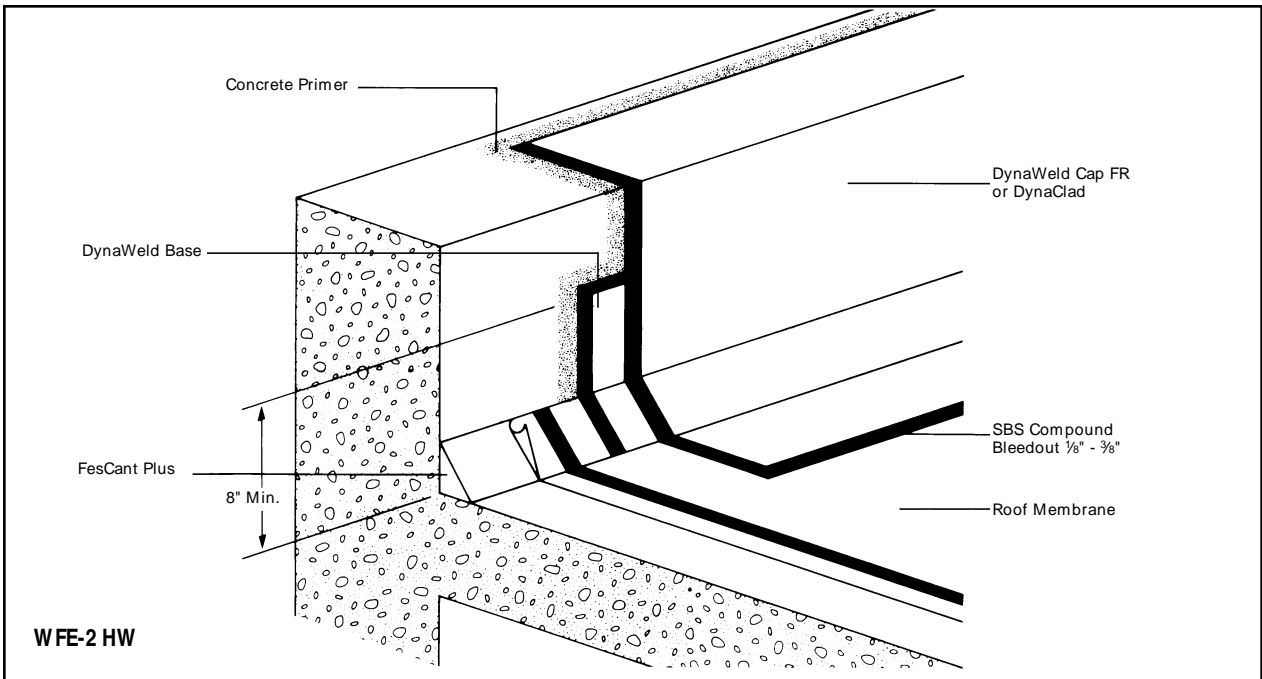
Roll size	1 square (13.9 m ²)
Roll weight	90 lbs (40.8 kg)
Roll length	32' 10" (10 m)
Roll width	39 3/8" (1 m)



Refer to the Material Safety Data Sheet and Product Label prior to using this product. For an identical copy of this data sheet ask for RS-4388.



**Specification WFE-2 HW
Bituminous Flashing**



For use over masonry constructions

General

This flashing specification is for use on non-nailable surfaces where the roof deck is supported by the wall or parapet and no nailing facilities exist.

Note: All general instructions contained in the current JM Commercial/Industrial Roofing Solutions Manual shall be considered part of this specification.

Primer: Apply Johns Manville (JM) Concrete Primer to the masonry wall to the full height of the proposed base flashing and allow it to dry thoroughly.

Materials

Johns Manville (JM) DynaWeld Base sheet.

Application

Base Flashing: The roof membrane must extend to the top of the cant.

Cut a strip of DynaWeld Base for use as a backer felt. The material should be cut such that when installed it extends up not less than 8" (203 mm) up the vertical surface and down to the bottom of the cant. The backer felt should not project onto the roof membrane.

Over the backer felt, install a layer of DynaWeld Cap FR or DynaClad. This material should extend not less than 8" (203 mm) and not more than 24" (610 mm) on the vertical surface of the parapet. The flashing sheet should project onto the roof membrane not less than 4" (102 mm).

Preparation of the 4" (102 mm) lap of DynaClad requires the removal of 4" (102 mm) of metal surfacing, creating the selvage edge. Next, apply heat to the lap that is being seamed, making sure there is a good compound flow to adhere the two surfaces. Check all laps for good adhesion.

Heat weld the flashing and backer felt so that they are firmly and uniformly set. All laps must be rolled with a 3" (76 mm) rounded edge roller. A minimum 1/8" to 3/8" (3 mm to 10 mm) bleedout of SBS compound shall be visible at the edge of all laps. If the compound bleedout is not accomplished, heat a trowel with a propane flame, lift the lap, apply a flame to both sides of the lap area and smooth the melted compound with the trowel to form an even seal.

Caution: Improper use of these materials and application equipment can result in severe burns, and/or damage to property. The mechanic must install these materials using the techniques recommended by JM and those found in "A Guide to Safety: Torch-On Modified Bitumens" available from the Asphalt Roofing Manufacturers Association.

Refer to the Material Safety Data Sheet and Product Label prior to using this product.

Application of Johns Manville (JM) APP and SBS Modified Bitumen Products may require the use of an open flame propane torch. Improper use of these materials and application equipment can result in severe burns, and/or other physical injury, as well as damage to property. In order to prevent these situations, the mechanic must install the materials using the techniques recommended by JM and those found in "A Guide to Safety: Torch-On Modified Bitumens" available from the Asphalt Roofing Manufacturers Association. These techniques have been endorsed by the National Roofing Contractors Association and the United Union of Roofers, Waterproofers and Allied Workers.

The Roofing contractor must ensure that all mechanics or applicators involved with the application of heat welded modified bitumens are properly trained not only in application and equipment handling, but safety measures. The contractor should verify that all roofing applicators involved with open flame application maintain and carry a valid Certified Roofing Torch Applicator ("CERTA") card as evidence of proper training. Further, the general contractor, jobsite superintendents and the building owner or its representative must also be knowledgeable and/or advised of the proper and necessary safety precautions applicable to heat welded roofing products.

All mechanics or applicators must carry, review, understand and adhere to the safety information and guidelines contained in "Torch Applied/Do's and Don'ts" as published and supplied by the Asphalt Roofing Manufacturers Association ("ARMA") which may be supplemented or amended, as well as the ARMA/NRCA "Guide to Torch Safety on Modified Bitumen" video tape. These are available from ARMA at: ARMA, 4041 Powder Mill Road, Ste. 404, Calverton, Maryland 20705-3016 (Ph. 301-348-2002). Do not begin application procedure until you read and fully understand these safety procedures and installation practices.

Johns Manville International, Inc. does not supervise building owners, contractors, mechanics or any other person in the application of heat welded applied modified bitumens and assumes no responsibility for fire damage or any other damages.

LIMITED WARRANTY/SPECIFICATIONS

All products sold are subject to the following limited warranty: Seller warrants that for a period of one year from the date of shipment the product will be free from defects in material and workmanship and is manufactured in all material respects to Seller's product specifications. Note: Seller's products may vary in details of design and construction from descriptions in any literature or from any sample, display or other model inspected by Purchaser.

SELLER DISCLAIMS ALL OTHER REPRESENTATIONS AND WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, IN FACT OR IN LAW, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. Every claim under this limited warranty shall be deemed waived unless in writing and received by Seller within 10 days of delivery if visibly damaged or defective, and, otherwise, within 30 days after the defect to which each claim relates is discovered, or should have been discovered, but in no event longer than 1 year after product shipment.

LIMITATION OF REMEDY

PURCHASER'S EXCLUSIVE REMEDY AND THE LIMIT OF SELLER'S LIABILITY FOR BREACH OF THE LIMITED WARRANTY SET FORTH IN THE ABOVE LIMITED WARRANTY/SPECIFICATIONS, WHETHER BASED ON NEGLIGENCE, BREACH OF WARRANTY, STRICT LIABILITY, OR ANY OTHER THEORY, SHALL BE, AT SELLER'S OPTION, REPAIR, REPLACEMENT WITH A LIKE QUANTITY OF NON-DEFECTIVE PRODUCT OR REFUND OF THE PURCHASE PRICE, PLUS REASONABLE COMMERCIAL CHARGES INCURRED FOR APPROVED RETURNS.

NO RECOVERY OF CONSEQUENTIAL OR SPECIAL DAMAGES

SELLER SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL OR SPECIAL DAMAGES BASED ON NEGLIGENCE, BREACH OF WARRANTY, STRICT LIABILITY, OR ANY OTHER THEORY, FOR FAILURE TO PERFORM ITS OBLIGATIONS UNDER THIS AGREEMENT. ADDITIONALLY, CONSEQUENTIAL AND SPECIAL DAMAGES SHALL NOT BE RECOVERABLE EVEN IF THE REPAIR, REPLACEMENT OR REFUND REMEDY FOR SELLER'S BREACH OF ITS LIMITED WARRANTY FAILS OF ITS ESSENTIAL PURPOSE OR FOR ANY OTHER REASON.

For additional sales and product information, contact the Johns Manville Regional Office nearest you.

NORTHEASTERN

437 Atlantic Avenue
Berlin, NJ 08009-9700
609.768.7003
FAX: 609.768.7034
**For Technical Services
Information**
800.345.9603

SOUTHEASTERN

3901 Roswell Road,
Suite 215
Marietta, GA 30062
770.578.3190
FAX: 770.578.3195
**For Technical Services
Information**
800.633.8594

MIDWESTERN

2151 W. Channahon Road
Rockdale, IL 60436-8559
815.744.1545
FAX: 815.741.6131
**For Technical Services
Information**
800.231.1064

SOUTHWESTERN

P.O. Box 9069
Fort Worth, TX 76147-2069
817.339.1500
FAX: 817.339.1540
**For Technical Services
Information**
800.654.0071

WESTERN

3rd & Harbor Streets
Pittsburg, CA 94565
925.432.6426
FAX: 925.427.2409
**For Technical
Services Information**
800.922.5922

Canadian Customer Service

Write to:
27 Pearl Street
Portland, ME 04101
877.766.3295
(877 Roof By JM)
FAX: 800.343.1331

For Guarantee Information

Guarantee Services
Department
P.O. Box 625001
Littleton, CO 80162-5001
303.978.2191
FAX: 303.978.2808

For bilingual and international assistance, please call:

Yolanda Griepentrog
303.978.4655 or
FAX: 303.978.3904

Product Information Center

**800.654.3103
303.978.2318 (FAX)**

**Additional Information:
FAX Express® 888.329.3977
www.jm.com**



Johns Manville

Roofing Systems Group

717 17th Street
Denver, CO 80202
800.654.3103
303.978.2318 FAX
www.jm.com

Health and Safety

Johns Manville maintains Material Safety Data Sheets (MSDS) for all of its products. These MSDS contain health and safety information for development of appropriate product handling procedures to protect your employees and customers. These MSDS are available and should be read and understood by all personnel using and handling these materials.

The physical and chemical properties of the products described herein represent typical, average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Consult a Johns Manville Regional Office to assure current information.

ENRGY™ 3 Roof Insulation

Description

ENRGY 3 is a rigid roof insulation board composed of a closed cell polyisocyanurate foam core bonded in the foaming process to universal fiber glass reinforced facers.

ENRGY 3 utilizes an environmentally compliant blowing agent containing pentane hydrocarbon to enhance the thermal performance of the foam insulation. This hydrocarbon has zero ozone depletion potential and conforms to the Montreal Protocol established in 1987.

ENRGY 3 meets the physical property requirements of ASTM C 1289-01 Type II, Class I, Grade 2 and CAN/ULC S 704. ENRGY 3 specialty products are also available as tapered panels, pre-cut miters and pre-cut crickets.

Use

ENRGY 3 provides high thermal insulation value over metal, nailable, and non-nailable roof decks in built-up, modified bitumen and single ply membrane roofing systems. It may be applied using hot bitumen, cold adhesives or mechanical fasteners. The universal facer on the top and bottom side provide a suitable surface for mechanical attachment to a structural deck as well as a suitable



surface to apply hot asphalt or cold adhesives. ENRGY 3 has been rated in Factory Mutual 1A-60 and 1A-90 fire and wind-resistant systems for BUR, modified bitumen and single ply systems in specific constructions. It has been classified by Underwriters Laboratories, Inc. as an approved roof insulation in numerous Class A roof constructions and Roof/Ceiling hourly fire-rated assemblies, and is classified by Underwriters Laboratories Canada.

JM also supports NRCA Bulletin #9 in recommending that a cover board of Fesco Board, Fiber Glass Roof Insulation or 1/2" Retro-Fit Board be installed over foam insulations in hot membrane systems.

Advantages

- High thermal efficiency
- Universal facer that is compatible with BUR, modified bitumen and single ply membrane systems
- Complies with EPA, CEPA and Montreal Protocol requirements
- Meets Clean Air Act Amendments of 1990

Typical Physical Properties

	Values	Test Method
Water Absorption	<3.5%	ASTM D 2842
Dimensional Stability Change.....	<2%	ASTM D 2126
Compression Resistance*		
10% Consolidation-psi (kPa) ...	20 (138) min.....	ASTM D 1621
Moisture Vapor Permeance	<1 perm.....	ASTM E 96
	(57.5 ng/(Pa•s•m ²))	
Service Temperature	-100 to 200°F	
	(-73° to 93°C)	
Tensile Strength-psf (kPa)	730 (35) nom.	ASTM D 1623

*Also available in 25 psi (172 kPa).

For Use Over Metal Decks

The minimum thicknesses of ENRGY 3 insulation over metal decks are as follows:

Width of Rib Opening	Up to 2 5/8" (67 mm)	Up to 3 3/8" (86 mm)	Up to 4 3/8" (111 mm)
Thickness of Insulation (Minimum)	1.0" (25 mm)	1.2" (30 mm)	1.3" (33 mm)

Sizes

ENRGY 3 is available in 4' x 4' (1.22 m x 1.22 m) or 4' x 8' (1.22 m x 2.44 m) boards (other sizes available by special request) and in thicknesses of 1.0" (25 mm) to 4.0" (102 mm). Some sizes are special order with minimum order quantities. Contact your JM Sales Representative for details.

Thermal Performance

Thickness (nom.)	C-Value (Conductance)		*Long Term Thermal Resistance (LTTR)		
	in	mm	BTU/(hr-ft ² •°F)	W/m ² •°C	
1.0	25	.167	0.95	6.0	1.05
1.5	38	.111	0.63	9.0	1.59
1.6	41	.104	0.59	9.6	1.70
1.7	43	.098	0.55	10.3	1.81
1.8	46	.092	0.52	10.9	1.92
2.0	51	.082	0.47	12.1	2.14
2.3	58	.071	0.41	14.0	2.47
2.5	64	.063	0.37	15.3	2.69
2.7	69	.060	0.34	16.6	2.92
3.0	76	.054	0.31	18.5	3.26
3.2	81	.051	0.29	19.8	3.49
3.3	84	.049	0.28	20.4	3.60
3.4	86	.047	0.27	21.1	3.71
3.6	91	.045	0.25	22.4	3.94
3.8	97	.042	0.24	23.7	4.17
4.0	102	.040	0.23	25.0	4.40

*The Long Term Thermal Resistance (LTTR) values were determined in accordance with CAN/ULC S 770.

The ultimate R-Value of these products will depend on individual installation circumstances.

Refer to the Material Safety Data Sheet and Product Label prior to using this product.

DuraBoard™ Roof Insulation

Description

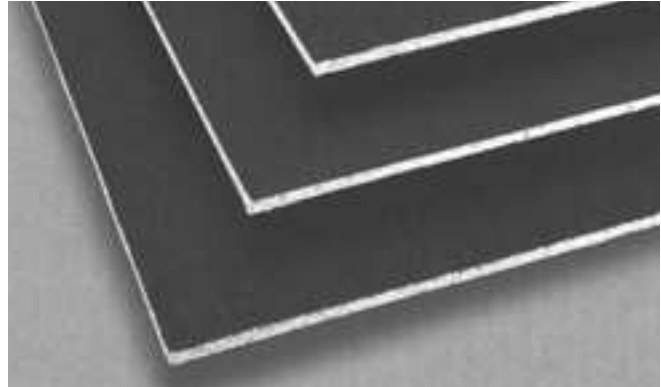
DuraBoard Roof Insulation is a high density, low thermal rigid insulation board, composed primarily of expanded perlite with reinforcing cellulosic fibers and selected binders. The top surface is sealed with a special polymerized asphalt emulsion coating which allows for direct application of SBS or APP membranes using torch application techniques.

Use

DuraBoard Roof Insulation is a general purpose board for use in new and recover applications or over closed cell foam insulations utilizing SBS or APP membrane roofing systems with torch application. Since an APP or SBS membrane can be directly applied to DuraBoard, the base sheet requirement can be eliminated and fastener quantity and labor time reduced.

There are numerous Factory Mutual fire and wind-resistant systems (90 psf to 135 psf ratings) and specific Underwriters Laboratories, Inc. Class A constructions approved with DuraBoard. (Note: 1/2" DuraBoard should not be used directly over steel decks if UL or FM approval is required, and should not be used directly over wood decks without a base sheet underlayment.) DuraBoard also meets the strength requirements of ASTM C 728.

DuraBoard's unique coating does not require pre-heating like heavily coated boards, concrete surfaces or base sheets; therefore, the flame of the application torch should be focused on the membrane roll, and



not applied directly to the surface of DuraBoard. This results in fuel savings and labor efficiencies.

DuraBoard is a universal substrate that can be used in hot mopped or cold application systems as well.

Advantages

- Direct application of SBS or APP membranes without base sheet requirement
- Superior fire resistance and durability
- Excellent strength and handleability
- Good dimensional stability
- Labor, fuel and material savings
- Minimum recycled content 25% by weight

Typical Physical Properties

	1/2" Thick (13 mm)	3/4" & 1" Thick (19 & 25 mm)
Water Absorption (ASTM C 209)		
% by Volume - 2 hours	5.5%	3.5%
Compression Resistance (ASTM C 165)		
5% Consolidation	psi3550 (kPa)241345	
10% Consolidation	psi7585 (kPa)517586	
Laminar Tensile Strength (ASTM C 209)		
	psi10 min.7 min. (kPa)6948	
Flexural Strength, psi (ASTM C 203)		
	psi12590 (kPa)862620	
Product Density (ASTM C 209)		
	pcf12.0 nom.12.0 nom. (kg/m ³)192192	
Linear Expansion (ASTM C 209)		
% max	0.5	0.5

Sizes

DuraBoard is available in 4' x 4' (1.22m x 1.22m) board size and 1/2", 3/4" and 1" (13 mm, 19 mm and 25 mm) thickness.

For Use Over Metal Decks

The minimum thicknesses of DuraBoard Roof Insulation over metal decks are as follows:

Width of Rib Opening	Up to 1 1/2" (38 mm)	Up to 3 1/2" (89 mm)
Min. Thickness of Insulation	1/2" (13 mm)*	3/4" (19 mm)

*For Underwriters and Factory Mutual approved constructions, 1/2" (13 mm) DuraBoard must be used over other approved foam plastic insulation boards in metal deck applications or can be used directly over concrete decks.

Thermal Performance

Thickness	Nominal C-Value (Conductance)		Nominal R-Value (Resistance)		
	in	mm	BTU/(hr*ft ² *°F)	W/m ² *°C	(hr*ft ² *°F)/BTU
1/2"	13	0.83	4.7	1.2	0.21
3/4"	19	0.56	3.2	1.8	0.32
1"	25	0.44	2.5	2.3	0.41

Refer to the Material Safety Data Sheet and Product Label prior to using this product. For an identical copy of this data sheet ask for RS-5091.

UltraFast® Fasteners and Plates

Description

UltraFast® Fasteners are #12 diameter, phillips or hex head fasteners with a modified buttress thread and corrosion resistant coating, exceeding Factory Mutual Approval Standard #4470 corrosion requirements.

The UltraFast® fastener has a nominal 0.22" (5.6 mm) thread diameter, with 12.5 threads per inch (12.5 threads per 25 mm). The UltraFast® Fastener is available with either a #3 phillips head or a 1/4" hex head. The point is designed for quick installation in new or reroof applications.

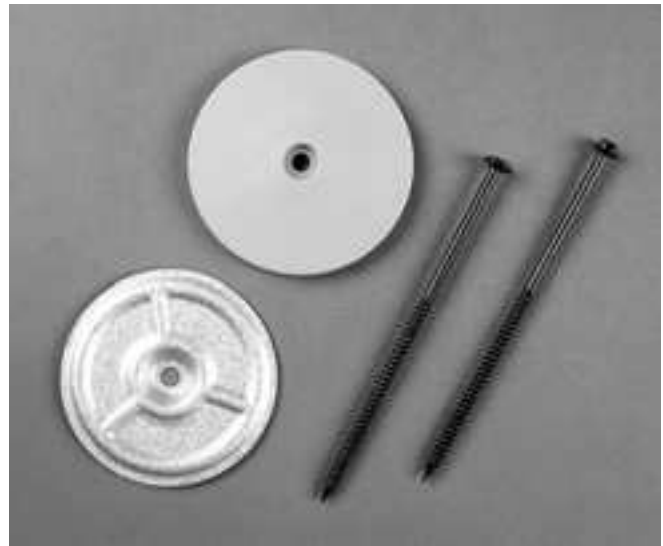
UltraFast® Locking Plastic Plates are 3" (76 mm) round, high strength polypropylene plates with a special locking feature.

UltraFast® Galvalume Metal Plates are 3" (76 mm) round or square, premium Galvalume metal plates.

Use

UltraFast® Fasteners and Plates are used to attach roof insulation to either 18-22 gauge (1.2 mm - 0.8 mm) metal, or wood decks. The screw and plate system provides positive attachment and resistance to up-lift forces.

UltraFast® Fasteners are approved to install JM roof insulation within any JM Roofing System Guarantee, either penal sum or NDL.



Advantages

- The Buttress thread design provides maximum pullout values and minimizes fastener pullout
- The Locking Plastic Plate prevents fastener pop-up
- UltraFast® Fasteners exceed the corrosion resistance standards of Factory Mutual Approval Standard #4470. UltraFast is also approved for use in Dade County, Florida.

Application

UltraFast® Fasteners shall be installed through UltraFast Metal or Locking Plastic Plates at Factory Mutual usage rates and patterns appropriate for the size and type of insulation.

The fastener must penetrate the metal flange a minimum of 3/4" (19 mm). The fastener is fully seated when the head is tight against the metal plate, or snaps into the UltraFast® Locking Plastic Plates. UltraFast® fasteners should not be overdriven as to cause the plate surface to deflect more than 1/16" (1.6 mm). Overdriven fasteners will significantly reduce fastener and plate performance, possibly damaging the membrane, decrease corrosion resistance and /or strip the deck. Underdriven or overdriven fasteners will not distribute the load over the plate properly. A standard screw gun with a disengaging clutch should be used to install UltraFast® Fasteners.

For steel decks, Factory Mutual requires that the fastener penetrates the deck at the top flange.

Sizes and Packaging

The UltraFast® Fastener is available in the following lengths:

1 5/8" (41 mm)	4 1/2" (114 mm)
2 1/4" (57 mm)	5" (127 mm)
2 7/8" (73 mm)	6" (152 mm)
3 1/4" (83 mm)	7" (178 mm)
3 3/4" (95 mm)	8" (203 mm)

Longer lengths are available.

Packaging: 1000 per box.

1 bit in each box.

Packaging in buckets is available for an additional charge.

Plates are packaged: 1000 per box.

Refer to the Material Safety Data Sheet and Product Label prior to using this product. For an identical copy of this data sheet ask for RS-7099.



Steel new or Concrete new or recover: Min 1.5 in. (38 mm) thick ENRGY 2, or ENRGY 3 roof insulation is placed loose over the deck and covered with min 1 /2 in. (13 mm) thick DuraBoard secured to deck with fasteners and plates at a max contributory area per fastener of 2 sq ft (0.2 sq m). Meets Class 1-90.



SBS MODIFIED BITUMEN SYSTEMS

Class A

Deck: C-15/32 **Incline:** 1/2

Insulation (Optional): — Any thickness, one or more layers, "Fesco-Foam", "DuraBoard", "ISO 1", "ENRGY-2" "ENRGY-3, hot mopped or mechanically fastened. All insulation joints offset from plywood deck joints, 6 in. min.

Base Sheet: — One or more plies Type G1 or "GlasPly IV" or "GlasPly Premier" or Type G2 "PermaPly 28", "GlasBase" or "Ventsulation", "DynaPly" or "DynaBase" (SBS modified bitumen), hot mopped or "DynaWeld Base", heat welded.

Membrane: — "DynaKap FR", "DynaGlas 30 FR", "DynaLastic 180FR", "DynaMax FR", "DynaLastic 250FR" or "DynaGlas FR" (SBS modified bitumen), hot mopped, or "DynaWeld Cap", heat welded.



Fastener Placement

4 x 8 Ft. (1.2 x 2.4 m) Boards

**Factory Mutual Fastener Density
4' x 8' Board**

- Choose the density required by the FM Approval Guide.
- Diagram shows number of fasteners required per board in field, perimeter (field + 50%) and corner (field + 75%).

1 Fastener per 1.33 Sq. Ft.

24
Fasteners/Bd

Field

36
Fasteners/Bd

Perimeter

42
Fasteners/Bd

Corner

1 Fastener per 1.45 Sq. Ft.

22
Fasteners/Bd

Field

33
Fasteners/Bd

Perimeter

39
Fasteners/Bd

Corner

1 Fastener per 2 Sq. Ft.

16
Fasteners/Bd

Field

24
Fasteners/Bd

Perimeter

28
Fasteners/Bd

Corner

1 Fastener per 2.67 Sq. Ft.

12
Fasteners/Bd

Field

18
Fasteners/Bd

Perimeter

21
Fasteners/Bd

Corner

1 Fastener per 2.9 Sq. Ft.

11
Fasteners/Bd

Field

18
Fasteners/Bd

Perimeter

20
Fasteners/Bd

Corner

1 Fastener per 3.2 Sq. Ft.

10
Fasteners/Bd

Field

15
Fasteners/Bd

Perimeter

18
Fasteners/Bd

Corner

1 Fastener per 4 Sq. Ft.

8
Fasteners/Bd

Field

12
Fasteners/Bd

Perimeter

14
Fasteners/Bd

Corner

1 Fastener per 5.33 Sq. Ft.

6
Fasteners/Bd

Field

9
Fasteners/Bd

Perimeter

11
Fasteners/Bd

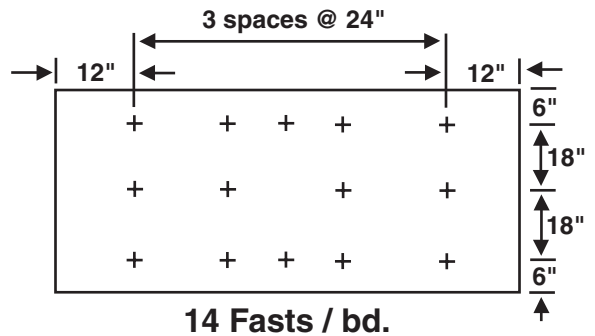
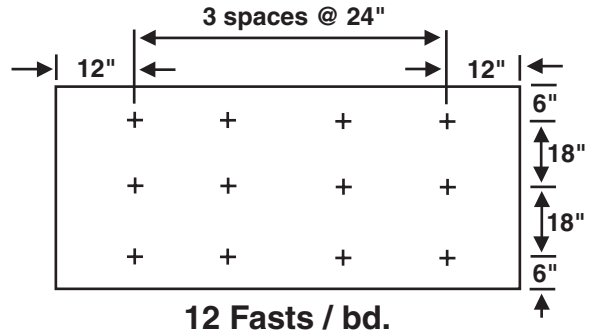
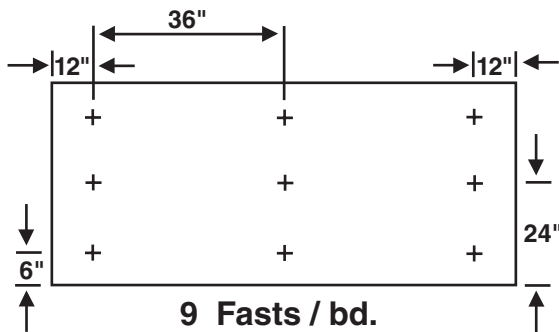
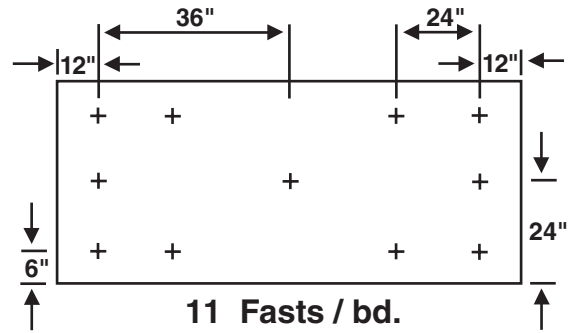
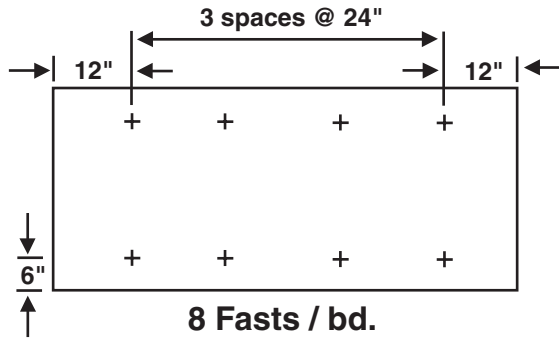
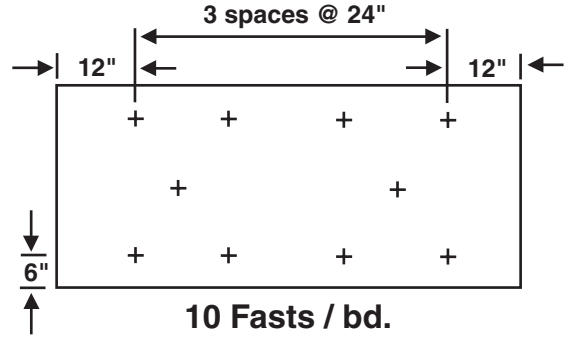
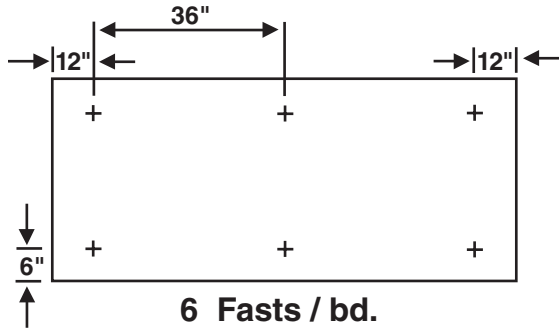
Corner



Johns Manville

Fastener Placement

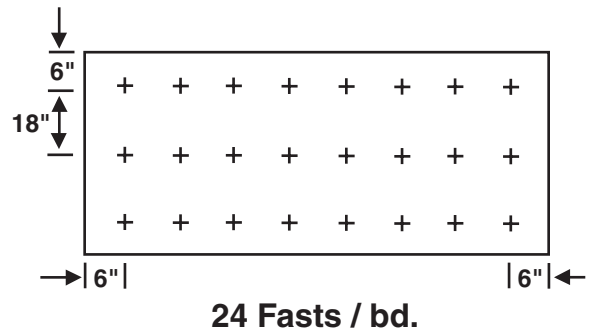
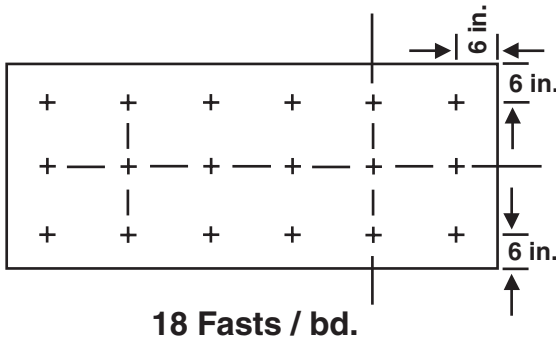
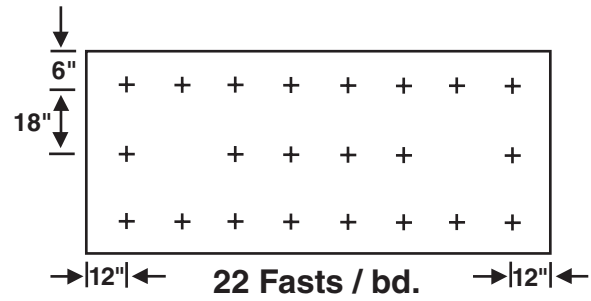
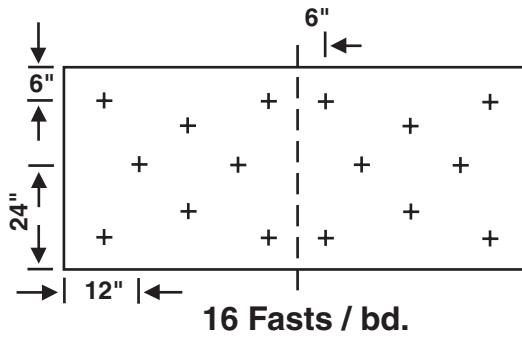
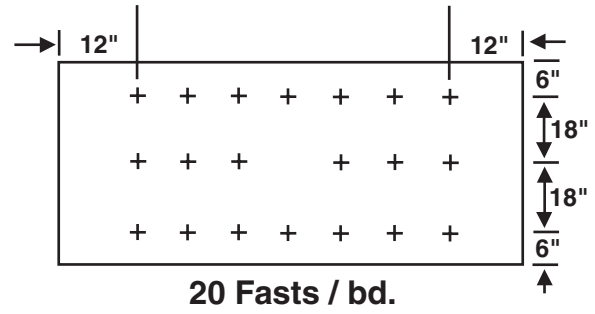
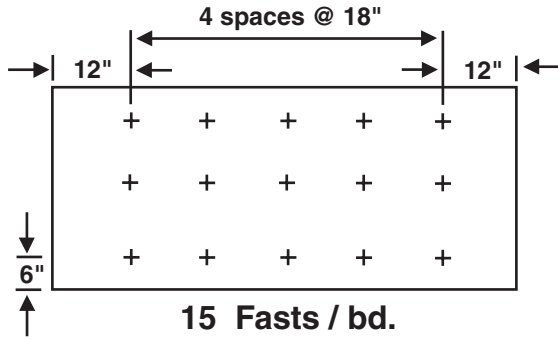
4 x 8 Ft. (1.2 x 2.4 m) Boards





Fastener Placement

4 x 8 Ft. (1.2 x 2.4 m) Boards Continued





Johns Manville

Fastener Placement

4 x 8 Ft. (1.2 x 2.4 m) Boards Continued

